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MARCH 21.

Mr. MEEHAN, Vice-President, in the chair.

Twenty-seven persons present.

*On the Condylarthra.*—Professor COPE made some observations on the characters of the newly-discovered group of Perissodactyle ungulates, which he had called the *Condylarthra*. He defined it as follows, comparing it with the typical *Perissodactyla*, which he referred to a suborder, under the name *Diplarthra*:

Astragalus with one uniformly convex distal articular face; humerus with epicondylar foramen. *Condylarthra*.

Astragalus with two truncate or concave distal articular facets for the cuboid and navicular bones; no epicondylar foramen of humerus. *Diplarthra*.

The *Condylarthra* have as yet been only found in lowest horizon of the Eocene period, the Puerco and Wasatch, and only on the North American Continent. Appropriately to this position in time, its structure indicates that it is the most primitive type of the order of the *Perissodactyla*. A number of genera and species belong to it, and these fall into two families, which are defined as below. They conform to the definitions of the order, in possessing an alternating arrangement of the carpal bones, and a third trochanter of the femur. The approximation to the *Hyracoidea* is greater than that of any group of the *Perissodactyla*. That order agrees with the *Condylarthra* in the simple articular extremity of the astragalus, which is, however, less convex; but it has a very peculiar articulation with the anterior face of the distal extremity of the fibula, seen in no other group of ungulates. In the manus the lunar bone is very peculiar, not being divided below into two facets as in other ungulates, and articulating with the carpals of the trapezoides series (the intercalare) as well as with the unciform. In these points the *Condylarthra* agree with other *Perissodactyla*. In *Hyrax* there is also no epicondylar foramen. The two families are defined as follows:

Dentition bunodont; toes 5-5; premolar teeth different from the molars above and below. *Phenacodontidæ*.

Dentition lophodont, with crescents and deep valleys; premolars partly like molars below; toes? *Meniscotheriidæ*.

The bunodont dentition and five toes on all the feet, give the *Phenacodontidæ* the lowest place in the suborder and order, as the most generalized type known. The *Meniscotheriidæ* have a quite specialized dentition, and until I learned its condylarthrous character, I was at a loss to account for the presence of such perfection in so old a type. The number of the toes is yet unknown, but I suspect from the large size of those I have seen, that they

are less numerous than in the *Phenacodontidæ*. It appears to have had no descendants, and is a good illustration of Dr. Kowalewsky's views as to the persistence of the "adaptive" over the "non-adaptive" types of articulation. Kowalewsky observed that the type of Ungulata which have the carpo-metacarpal, and tarso-metatarsal articulations, simple and not alternating, have become extinct. In those which persisted, the metapodials articulate with two bones of the carpal or tarsal series. The same rule has generally applied in the Ungulates to the distal astragalar articulation. The *Diplarthra* and *Amblypoda*, with the double articulation, have left descendants, while the *Condylarthra*, with the single articulation, have disappeared without leaving a trace. The *Proboscidea*, which have the same simple distal articulation, still remain, however, to show an exception to this generalization.

The *Condylarthra* are distributed as follows:

| PHENACODONTIDÆ.                   |    | Puercó. | Wasatch. |
|-----------------------------------|----|---------|----------|
| <i>Anacodon</i> , . . . . .       |    |         | 1        |
| <i>Phenacodus</i> , . . . . .     | 2  |         | 8        |
| <i>Protogonia</i> , . . . . .     | 1  |         |          |
| <i>Pantolambda</i> , . . . . .    | 1  |         |          |
| <i>Catathlæus</i> , . . . . .     | 3  |         |          |
| <i>Anisonchus</i> , . . . . .     | 1  |         |          |
| <i>Haploconus</i> , . . . . .     | 3  |         |          |
| <i>Periptychus</i> , . . . . .    | 1  |         |          |
| MENISCOTHERIIDÆ.                  |    |         |          |
| <i>Meniscotherium</i> , . . . . . | 3  |         |          |
|                                   | 15 |         | 9        |

The genera of *Phenacodontidæ* are distinguished as follows:

- I. Fourth superior and inferior premolars with an internal cusp.
  - Last superior premolars with two external cusps; inferior molars with well-developed cusps. *Phenacodus*.
  - Inferior molars with flat grinding faces; no cusps. *Anacodon*.
  - Last superior premolar with but one external cusp; inferior molars with *V*<sub>s</sub>. *Protogonia*.
  - Inferior premolars consisting of an anterior *V* and a posterior longitudinal crest. *Pantolambda*.
- II. Fourth superior premolar with a high internal cingulum concentric with the single external cusp.
  - a. Superior molars with intermediate tubercles; fourth premolars with internal cusps.
    - Posterior inner tubercles of the superior molars not cut off; several superior premolars with internal cingulum. *Catathlæus*.
  - aa. Superior molars with intermediate tubercles forming branches of a *V* with the anterior inner; posterior inner distinct and cut off by a groove; inferior premolars without inner cusps; first inferior true molar tubercular.
    - Third superior premolar with elevated internal crest. *Anisonchus*.
    - Third superior premolar a cone without inner crest. *Haploconus*.
  - aaa. Superior molars unknown; inferior true molars with anterior lobe; the first with a transverse heel instead of opposite tubercles.
    - Anterior external lobe of inferior molars forming a cutting edge. *Periptychus*.

The only genus of the above, in which the structure of the feet is well known, is *Phenacodus*. It is partially known in *Catathlæus*.

The only genus of *Meniscotheriidæ* is distinguished as follows:

Inferior premolars consisting of two *Vs*.

*Meniscotherium*.

*Variation in the Nest Forms of the Furrow Spider, Epeira strix*.—Rev. Dr. H. C. McCook remarked that he had observed that some of the orbweaving spiders had a marked tendency to vary the forms of their nests. The spinning work of spiders may be classified as (1), the *snare*, spun for the capture of prey; (2), the *enswathment*, by which insects are disarmed and prepared for food; (3), the *gossamer*, used for purposes of aqueous or aerial locomotion; (4), the *cocoon*, spun for the propagation and protection of the species; and (5), the *nest*, which is a domicile more or less elaborate and permanent, within or under which the araneid dwells for protection against enemies and weather changes. As a rule, the great groups of Orbweavers differ from each other and agree within themselves in the characteristic form of nest. The form prevailing in each family is substantially the same; each species appears to adhere quite steadily to one characteristic form; but there are some marked variations in the habit of certain species, the most decided of which have been observed in the case of *Epeira strix*. Some examples of this were given.

1. The ordinary nest of *Strix* when domiciled in the open field or wood, is a rolled leaf. A single leaf is taken, the edge pulled up, drawn under and fastened by adhesive threads into a rude cylinder, within which the spider hides during the day-time. A thread connection with the foundation lines of the snare is maintained; but rarely with the centre of the orb by a taut trap-line as is the habit of the Insular spider, *Epeira insularis*.

2. A second form of nest varies from the rolled leaf nest, in having the edges of two adjacent leaves bent towards each other and lashed together on the exterior at the juncture by silken cords, and on the interior by adhesive tissue-web. An oval opening is left at the united points of the leaves, through which the connecting line passes to the snare. The spider domiciles within the leafy cavern thus formed.

3. Again, the spider avails herself of small holes in wood or stone, openings in fences, the interspace between curled bark on the trunk of old trees, or some like cavity, which she appropriates as a nesting-place. A slight lining will generally be found upon the concave surface. Dr. McCook had noticed that in such cases the snare is sometimes diverted from its normal shape in order to give a convenient approach thereto from the den. One such example was found spun between a side of the Peace Fountain in Fairmount Park (Philadelphia) and the stone wall adjoining.